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High pressure pure- and mixed sour gas transport properties of Cardo-type block co-polyimide membranes

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Abstract

Multi-block co-polyimides 6FDA-CARDO/6FDA-Durene with varying segmental lengths were synthesized and pure and mixed sour gas transport properties through dense membranes were investigated as function of feed pressure, temperature and gas composition. Pure gas measurement indicated that block co-polyimide 6FDA-CARDO/6FDA-Durene (2500/2500) membrane exhibits high permeation properties and separation characteristics with CO₂ permeability and CO₂/CH₄ selectivity of up to 239 barrer and 28 respectively. The block co-polyimide also showed excellent performance under harsh sour gas environment (i.e. high H₂S content of up to 36 vol. % and feed pressure of up to 55 bar for a gas mixture consisting of CO₂, CH₄, N₂, C₂H₆ and H₂S). At 36 vol. % H₂S, the membrane exhibits H₂S permeability and H₂S/CH₄ selectivity of up to 275 barrer and 24 respectively. These values and separation performance exhibited by the co-polyimide are comparable and very competitive even, as

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